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Edited by JOHN BARTLETT.

THE GENESIS OF THE CAMERA.

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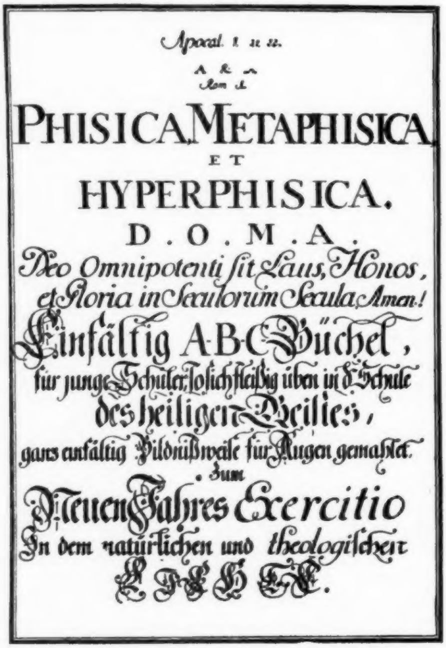
THE accompanying illustration,—a page from an ancient illuminated Rosicrucian MS., reproduced by the camera and its modern appliances in perhaps a less number of seconds than it took the mystic recluse of the sixteenth century, in his anchorite cell, days to laborously execute it with his crude quills and brushes,—this page is one of thirty folio sheets, twelve by eighteen inches, composing the old tome, and which contains the secret theosophy of the Rosicrucians.

The title sheet of the folio, a fine specimen of Latin, Gothic and old German "Fractur Schrift," is executed in four colors—red, blue, green and black, almost all of which are as bright as when first written, the rough, uncalendered paper alone showing signs of age and discoloration. Unfortunately there is neither date nor name on the title; the age of the MS., however, is located by family traditions to lie between the years A.D. 1560-1600, which fact is confirmed by the water-mark and make of the paper composing the sheets.

So jealously were the secrets of this mystic fraternity guarded from the world, and so great was the care taken in the arrangement of their written symbols, that even when by accident or trickery any of their MSS. came into the possession of the uninitiated, nothing would be imparted or disclosed to the outer world; as a sequence so little is known of the fraternity at the present day, that it has even been questioned whether such a fraternity ever existed except in the fertile imagination of writers of fiction. Most modern writers, however, class the fraternity with the Eleusinian mysteries of a still more ancient period.

The contents of the old volume may be judged by the specimen here given (Fig. I). It is number twelve of the series, and was selected as giving the best general idea of the work. The colors used are red, yellow, blue, green and black, and they are similar to those on the title—sharp and bright.

Unfortunately the plain, hard black-and-white of our silver print can give but little conception of the beauty of this page from the old MS. This is further aggravated by the fact that several of the mystic symbols in the original are bright yellow, with vermilion inscriptions, while in the copy they show a brilliant black, with hardly a trace of any legend; for instance, the dark circle near the top, between



I.—TITLE PAGE OF ROSICRUCIAN MS.

IN THE ORIGINAL, THE TWO MAIN TOP LINES ARE VERMILION, THE FOUR LETTERS, D. O. M. A., AND TWO FOLLOWING LINES, BLACK, WHILE THE SEVEN REMAINING LINES ARE EXECUTED IN RED, BLACK, BLUE, BLACK, GREEN, BLACK, AND RED, RESPECTIVELY.

"Vater" and "FIAT," in the MS. is yellow, having the Ineffable name inscribed thereon in Hebrew characters. The segments of circle around the star directly below are also yellow, with the letters "S-A-C-R-O" in red.

The irregular octagon surrounding the triangle is of the same color, with the legend, "Und bring ein jeder seines gleichen" in red; the same is the case with the stars within the different circles which form the symbol on the lower half of the page. Of the fourteen large stars on the outer circumference the top one is inscribed "*Polus Arctica*"—the opposite one "*Polus Antarctica*." The remaining twelve contain the signs of the Zodiac, while the larger stars on the inner circles contain the symbols of the planets.

The centre of these circles, two interlaced triangles forming a six-pointed star, is surrounded by a band of yellow containing within the segments the letters "C-A-O-S," while the inner circle surrounding the hexagon formed within the star is a sky-blue.

Of the hidden import and meaning of the symbols here given, or the mystic symbolism of the colors used, it is not the purpose of this paper to speak; however, should the page by chance come to the notice of any Cabbalist, student of Occult

Theosophy, or well-informed member of the higher degrees of Scottish Rite Masonry, he will at once find some familiar characters and symbols. The general reader if he feel so disposed may make his own deductions; however, it will hardly be just or fair to judge either the fraternity or their theosophy superficially, especially when viewing them through the lenses of the last decade of the nineteenth century.

The reader will, no doubt, wonder what the mystics of the past ages with their occult speculations have in common with the photography of the present day—two subjects as diametrically opposite as the poles of the earth's axis; however, this great distance between the two subjects lessens when we reflect that it was the experiments and researches of members of this identical mystic brotherhood which resulted in the discovery of the principles of the photographic camera of the present day.

It was Fra Giambattista della Porta (*nat.* 1540-1615), the Neapolitan scientist and mystic, who, towards the close of the seventeenth century, gave to the world his secret of the camera obscura, of which he was the discoverer. It was in his house that the brotherhood met and held their secret meetings until interdicted by the church authorities.

His investigations and deductions on the various scientific subjects, although to us in this enlightened age often seeming incomplete and frequently absurd, have nevertheless proved the stepping-stone for many a philosopher of later date, and whose reputation now rests upon the laurels which in reality belong to the almost forgotten recluse of old. This applies especially to the science of optics.

As a matter of curiosity, as well as interest, we give Porta's description of his invention in full as it appeared in the English translation of his *Magia Naturalis* (Neap., 1589), published, as the title informs us, "London, 1658, and sold at the *Angel in St. Paul's Churchyard.*"

To See all Things in the Dark, that are Outwardly Done in the Sun, with the Colors of Them.

You muſt ſhut all the Chamber windows, and it will do well to ſhut up all holes beſides, leſt any light breaking in ſhould ſpoil all. Onely make one hole, that ſhall be a hand's breadth and length; above this fit a little leaden or braſs Table, and glew it, ſo thick as paper; open a round hole in the middle of it, as great as your little finger; over againſt this, let there be white walls of paper, or white cloths, ſo ſhall you ſee all that is done without in the Sun, and thoſe that walk in the ſtreets, like to Antipodes, and what is right will be left, and all things changed; and the farther they are off from the hole, the greater they will appear. If you bring your paper or white Table nearer, they will ſhow leſs and clearer, but you muſt ſtay awhile, for the images will not be ſeen presently; because a ſtrong ſimilitude doth ſometimes make a great ſenſation with the ſence, and brings in ſuch an affection, that not onely when the ſences do act, are they in the organs, and do trouble them, but when they have done acting, they will stay long in them; which may eaſily be perceived. For when men walk in the ſun, if they come into the dark, that affection continues, that we can ſee nothing, or very ſcantly, becauſe the affection made by the light is ſtill in our eyes; and when it is gone by Degrees, we ſee clearly in dark places. Now will I declare what I ever concealed till now, and thought to conceal continually: If you put a ſmall

centicular Cryſtal glaſs to the hole, you ſhall preſently ſee all things clearer, the countenances of men walking, the colors, Garments, all things as if you ſtood hard by; you ſhall ſee them with ſo much pleaſure that thoſe that ſee it can never enough admire it. But if you will

See All Things Greater and Clearer,

over againſt it ſet the Glaſs, not that which diſſipates by diſperſing, but which congregates by uniting, both by coming to it, and going from it, till you know the true quantity of the Image, by a due appropinquation of the centre; and ſo ſhall the beholder ſee more fitly Birds flying, the cloudy ſkies, or clear and blew, Mountains that are afar off; and in a small circle of paper (that is put over the hole) you shall ſee as it were an Epitomy of the whole world, and you will much rejoyce to ſee it, all things backwards, becauſe they are neer to the centre of the Glaſs; if you ſee them farther from the Centre, they will ſhow greater and upright, as they are, but not ſo clear. Hence you may,

If You cannot Draw a Picture of a Man or anything else, Draw it by this Means.

If you can but onely make the colors, this is an art worth learning.

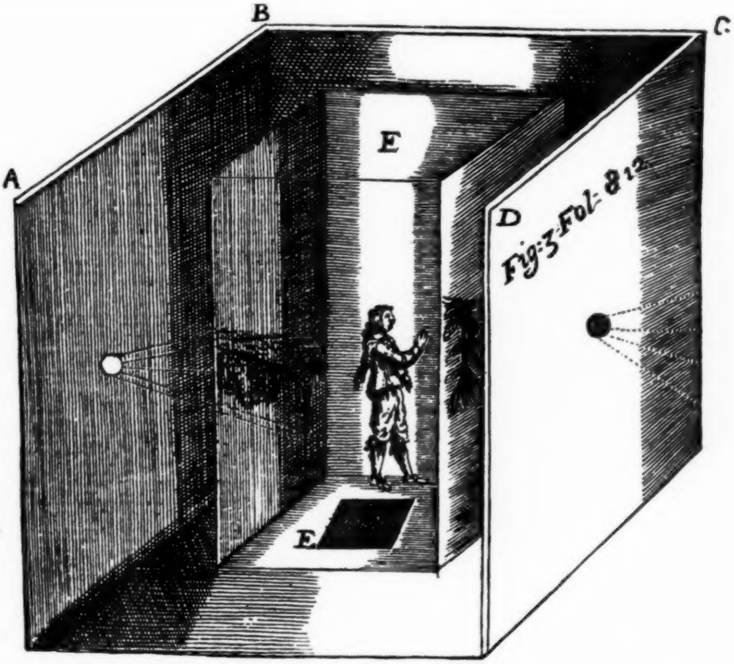
It is obvious that to be of any practical use the apparatus must be portable. To accomplish this object a camera was built as shown in the annexed engraving; it rested on two stout timbers, and was drawn from place to place by a yoke or two of strong oxen; it had lenses at the two opposite sides, and was large enough to admit a man within the inner chamber formed by the screens. The spectator entered the camera by a trap-door in the bottom, the image was then thrown on a transparent or oiled sheet of linen, when the picture could be drawn or painted by the artist within the camera (Fig. II).

It was Frater Athanasius Kircher, a native of Fulda, in Germany (*nat.* 1601; *ob.* 1680), who discovered the properties of two lenses connected by an adjustable tube, in 1645, while experimenting with Porta's invention (*Vide Artis Magna, Lucis et Umbrea, Roma*, 1646).

Kircher was one of the greatest students of his day, as well as a voluminous writer. He devoted much of his time and research to the science of optics. After his discovery of the adjustable tube he constructed a small portable camera. It was composed of a cylindrical chamber or tube, with the lenses at one end, while a white card or paper was so placed as to be within the focus of the glass upon which the external image was depicted.

Among his other discoveries was what we know as the "Dark Lantern." He describes it under the caption, "Lucernam Artificosam Construere, quæ in remota distantia Scripta legenda Exhibeat" (*Artis Magna, Lib. X., Magia, Pars III., pp. 887*).

In these experiments Kircher was actively seconded by his famulus, one Casper Schottus, a native of Wurtzburg, in Germany (*nat.* 1608; *ob.* 1666). He improved the lantern of Kircher slightly, and described it in his *Magia Universalis Naturæ*,



II.—CAMERA OBSCURA OF [illegible]89

et Artis (Herbipolis, 1657), under the name of Dioptric Lantern (Laternam Dioptrican Construere, que in remota distantia exhibeat Scripta Legenda, pp. 479). This was nothing more nor less than the dark or bull's eye lantern of the present day.

The experiments of Kircher and his associate were destined to lead to still greater results. It was just twenty years (1665) after Kircher's discovery of the adjustable tube that it occurred to him to combine the lens tube with his Catoptric Lantern, with a space to introduce a transparent glass slide between the sight and the lenses; the result of this was the Magic Lantern,

This apparatus, crude and imperfect though it was, at once became a powerful instrument in the hands of astrologers, necromancers, and the conjurers of the day, who used the invention for their own sinister purposes.

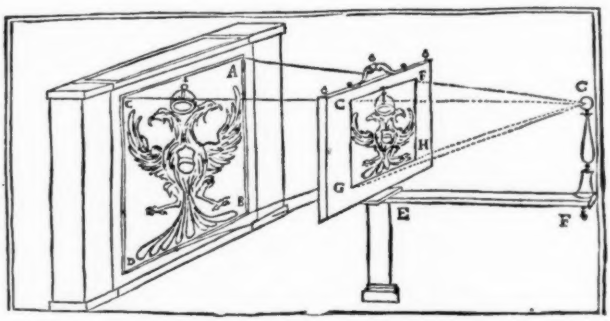
One of the favorite tricks of the juggling necromancer was to throw an image on a dense cloud of smoke, representing that they were demons or spirits who appeared at his call. The proceeding usually commenced by a so-called charmed circle being drawn on the ground. Astronomical and magical characters were marked at the various segments of the circle. A brazier of live coals was then placed in the centre. Everything being in readiness, the dupe was introduced within the charmed circle. He was invariably placed with his back to where the confederate was concealed who operated the "Laterna Magica;" the dupe was also told that to look behind him would result in instant death; the wizard then took his

ATHANASIUS KIRCHER. BORN 1601, DIED 1680.

place within the circle opposite the dupe in front of the brazier, the incantation would then be recited in some unknown tongue, resinous and aromatic gums and spices were thrown on the live coals for the double purpose of causing a dense wall of smoke and at the same time stupefying the senses of the dupe. At a given signal, when the cloud of smoke was dense enough, the confederate flashed on the demons or spirits, as the case might be, and the deed of enchantment was complete,—further what the victim did not behold, his excited imagination supplied.

However, after the secret of the Laterna Magica and its construction became more generally known, the apparatus was relegated to the scientists and institutions of learning, where it rested until about the commencement of the present century, when it was resurrected from the dusty shelves of a German university to become a toy for children of the nobility; in later years it was made in cheaper form by a Nuremberg toy maker, and it was soon within the reach of the middle classes.

In later years, since the advent of photographic slides, the invention of the long forgotten Rosicrucian frater of the seventeenth century has become the most popular philosophical apparatus for the amusement and instruction of the general public in almost all quarters of the globe.



III.—ENLARGING APPARATUS.

Engraving No. III. is a copy of Kircher's enlarging process, taken from *Artis Magna.* It is the first known use of translucent or glass plates for the purpose, and is the germ of the present enlargement process so extensively used in all parts of the world.

To follow up the various improvements and perfections of Porta's and Kircher's inventions is not within the scope of this paper; it will suffice, however, to say that with all the modern inventions and perfection of machinery, the principles of the apparatus made by the two recluses of old, and laid down in the *Magia Naturalis* and *Artis Magna*, remained the same to the present day.

Furthermore, it is a fact to be remembered that it was the adepts of this old fraternity who first discovered the action of light on the salts of silver.

While engaged in their alchemistical experiments on the transmutation of metals, they noticed the fact that horn silver (chloride of silver) suffered discoloration by exposure to the sun's rays. This attracted much attention, and became well

known to the adepts (*Mundus Subter, Tom ii.*, 1665), without, however, leading to any practical results at that early day. As before stated, it was left to others of a later date to perfect and combine these discoveries of the old Rosicrucian mystics and philosophers, until they resulted in the beautiful art of photography of the present day, with its still greater possibilities for the future.

JULIUS F. SACHSE.

Leopard, Pa., 1889.

STEREOSCOPIC PHOTOGRAPHY.—III.

AMONG the defects that are seen in the stereoscopic photograph, particularly landscapes with foliage, a snowy appearance of the lights is a very common one. Views of roads with overhanging trees, shaded paths in lawns, and other subjects of the kind, although capital ones for the stereoscope on account of the realistic manner in which the distance recedes and causes the boughs and heavy gnarled trunks near at hand to stand out, will, nevertheless, at times tax the operator to his uttermost. It will be found, on first looking at the finished print in the stereoscope, that while the view is very pleasing in all other respects, every high light on the foliage,—and generally, too, those on the ground and most of the prominent objects,—looks as if snow had fallen and was lying upon it. Uninitiated persons will sometimes exclaim in perfect good faith, "But tell us how this is. Did you have a snowstorm in the night? I see snow on the ground and on the leaves, and yet the leaves don't look frost-bitten or shrunken." Now these good people, without being aware of it, have in reality made a wholesome, true, and yet sharp criticism on the photographer's efforts. As we have just said, it is sometimes exceedingly difficult to get such subjects free from this snowy appearance.

A failure or two of this kind, once made, and criticized in this manner by persons who know nothing of photography, will do a good deal toward arousing the photographer's attention to the necessity of care in the selection of his subject and his choice of light. It not unfrequently happens that the objectionable appearance will be wanting entirely if the view be made in a partly-obscured sun or diffused light. This will often serve for such subjects as ivy-clad spires, walls, trees, etc. The leaf of the ivy, being highly polished and glossy, reflects light almost like a mirror, and is very apt to look snowy in the print. The Virginia creeper, so common with us, is not so difficult to manage, but it also will do well in a rather subdued light.

The development of plates where the exposure has perforce had to be made in an unfavorable light such as we speak of, should be carefully watched, and the solution so mixed as to produce softness rather than brilliancy. A good deal may be done in this respect; even in the old days of wet collodion it was possible to keep down excessive brilliancy when working in a strong, crude light, by diluting the developer fully one-half, and giving a slightly longer exposure to make up for the diminished energy of the weak solution.

Before dismissing this part of our topic, we may say that if the snowiness is confined to a portion only of the picture, a good effect may be obtained by slightly sunning the print after removal from the printing frame. It would hardly do to treat the whole print in this manner, except in extreme cases.

As we said in our paper of last month, the trimming and mounting of stereoscopic pictures is an arduous part of the work. If the work be done on a large scale commercially, a trimmer for the purpose will be a *sine qua non*. But if the the amateur simply trims and finishes his own pictures, he will find it best to proceed as follows: Have a piece of plate-glass ground to the exact size required for the height of the prints, say 3¼ inches, and somewhat longer than the two prints when mounted side by side, say 7 inches. Use this shape for the first trimming, taking care to get things square and true, and to keep objects in each print at equal heights from the bottom line. Have another glass shape the exact size of the trimmed print, 3¼ by 3 inches, and cut out each print so as to include as nearly as possible the same amount of subject.

If the large size of stereoscopic card measuring 7x4 inches is used, the first glass shape may be 7x3¾, and the second one 3¾x3 inches. In attaching the prints to the card, bring the neighboring edges as close as possible without touching. Of course, before trimming out, the prints should be marked rights and lefts.

The question of cutting the negatives, by which this somewhat troublesome process of trimming is avoided, was discussed in our last paper.

The distance between the centres of the pair of pictures when mounted should never exceed 3 inches. Perhaps for the majority of persons 2⅞ inches would be safer. The height, however, may be, as we have already said, 3¾ inches or even more.

To make stereoscopic transparencies on glass from uncut negatives is a troublesome matter. It may, however, be done by making an affair like a long, narrow, shallow tray, in the centre of whose bottom is cut a rectangular hole the size of the stereoscopic picture. The negative laid down on this, on its reverse side, can be slid along so that the right and left side successively come over the hole. The sensitive plate is then laid down on the negative so that its *left* side comes on the *right* half of the negative, and the tray or frame is closed by a suitably arranged door at the back, which also carries a spring to keep the sensitive plate in position on the negative. The exposure having been made, the negative and plate are shifted, and the second exposure given, which of course must be just equal to the first one, and made before an illuminant of equal strength. The transparency when developed will not require transposing. It is far better, however, to cut and transpose the negative, and if it is wisely determined not to risk the original, a reproduced duplicate may be used. The transparency can then be made at one operation.

Binocular vision, or the power of the unaided eyes to see the stereoscopic picture as it appears under the lenses of the stereoscope, is a valuable possession. In giving the following directions for acquiring this power it must also be said that it is not free from the risk of making the eyes squint, and that some persons are unable to succeed even after repeated trials. Seat yourself with the two forefingers of each hand held squarely before the face at arm's-length, and about two inches from each other, the backs of the hands directed outwardly. Fix the eyes on some small object on the opposite wall of the room, and it will be seen at once that the eyes will not focus both for the fingers and for the opposite wall, but that where the gaze is directed to the distant object the fingers appear to approach each other so that a single finger is seen with a nail on each outer side. If

this can be done without pain or straining, increase the distance between the fingers to three inches. If again successful, take the stereoscopic picture and do the same with it. Three images side by side will then be seen, the middle one possessing the characteristic relief of the picture as seen in the stereoscope.

ELLERSLIE WALLACE.

EIKONOGEN.

(*A paper read before the Photographic Society of Philadelphia, October 2d.*)

EIKONOGEN is the name of a new developing agent recently placed before the photographic public. It is the patented invention of a Dr. Andriessen, of Berlin, and is a chocolate-colored powder showing a crystalline formation of small laminæ, and has no taste or odor. It is said to be non-poisonous. It is sparingly soluble in water, about eighteen grains dissolving in an ounce, and forming a solution of a bright grass-green color. In chemical composition it is said to be an amido-B-naphthol-B-monosulphonate of sodium. It is claimed for this new developer that while its developing action is much quicker than either pyro or hydrochinon, it brings out the most perfect detail in the picture, even though a very short exposure has been made. It gives a clear negative of a bluish-black color, and is especially recommended for instantaneous work. It is also said to give excellent results in developing lantern slides and transparencies.

During the past week I have made some few experiments with Eikonogen, particularly as a developer for lantern slides, and I propose to discuss briefly this evening the results of these experiments. The developer used was a slight modification of the formula given by the inventor, Dr. Andriessen, that having been found to be almost too strong to give the best results. It was prepared according to the following formula.

No. 1.	Eikonogen	½ ounce.
	Sulphite Sodium, cryst.	1 ounce.
	Water	1 pint.
No. 2.	Carb. Sodium, cryst.	¾ ounce.
	Water	1 pint.

For normal developer, take of No. 1 and No. 2 each one part, water two parts.

The results obtained with this developer have so far seemed to justify all that has been said in its favor. Two lantern plates were given the same exposure (a rather short one) upon a given negative, and then placed in separate dishes. To one was added the Eikonogen developer mixed as above, to the other a hydrochinon developer prepared with phosphate and carbonate sodium. With the Eikonogen the image began to appear in about ten seconds, and in two minutes was fully developed, ready to be washed and fixed. With the hydrochinon developer the image began to appear gradually at the end of the first minute, and at the expiration of five minutes was not fully developed. It required nearly five minutes more to complete the development, and the resulting plate lacked density and detail, and was evidently much undertimed. On the other hand the plate developed with Eikonogen had good density and was full of the most exquisite detail.

The color of lantern slides produced by Eikonogen varies according to the strength of the developer. With the formula previously given the color is a clear bluish-black in the deep shadows, graduating down to a beautiful gray in the lighter portions of the picture. If a developer is used containing one-half the quantity of No. 2, and twice as much water, and a longer exposure be given, the tone obtained is much warmer, and is of an olive brown or gray color, very soft and pleasing. With both developers, the most beautiful detail was obtained, and I consider that, for lantern slides, this developer when properly used will give results far superior to those obtained with either hydrochinon or oxalate. These experiments were merely tentative, and more familiarity with this new agent, and possibly some modification in the formulæ, will be required before the best results can be obtained. It works quickly, does not stain the film, and can be used for a number of plates before becoming exhausted. The six lantern slides I show you this evening were developed with one ounce of this developer, and with the last plate it showed no signs of exhaustion.

As a developer for negatives and instantaneous work, Eikonogen will probably prove as excellent as it has for lantern slides. The negatives I show you now were made this afternoon about 4 P. M. with a Hawkeye camera, using Cramer plates, sensitometer 35. Although the light was rather weak and the plates not very fast, I think you will find that they show excellent detail and seem if anything to appear a little overtimed. I am now experimenting with Eikonogen as a developer for negatives and especially instantaneous work, and trust to make a further report at some future meeting.

As far as its price and developing power are concerned, it is probably quite as cheap if not cheaper than pyro. It costs now about 40 cents per ounce, and in developing power it will probably go much further than the pyro, while as an additional attraction it does not become dark and discolored, nor will it stain the fingers, and hence will be much preferred by the amateur.

As a developing agent I believe that Eikonogen has come to stay, and where its use is fully understood, I believe it will be found to be the most formidable rival to pyro that has yet appeared.

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ORTHOCHROMATIC PHOTOGRAPHY WITH GELATINE PLATES.

[*Read before the Photographic Convention of the United Kingdom.*]

TO address the convention again on orthochromatic photography presents some little difficulty, because on the one hand there are many in my audience who are well acquainted with the subject, whilst on the other hand there are some to whom it is not so familiar, and possibly even some to whom orthochromatic photography is only a name. I take it, however, that at this jubilee meeting of photographers it is desirable that the papers should, as far as possible, represent the present position of our knowledge, and I will, therefore, venture to recapitulate the main points that are already established.

Ordinary gelatine plates fail to represent colored objects with their proper degrees of relative brightness, or, as artists say, with true "values," because the plates are most sensitive to blue and violet rays, much less sensitive to green, and very slightly sensitive to yellow, orange, and red; whilst the human eye is most sensitive to yellow, somewhat less sensitive to green and orange, still less sensitive to red, and least sensitive of all to blue and violet. The rays which produce the greatest effect on a photographic plate are those which produce the least effect on the eye, and *vice versa*. As a necessary consequence, blue and violet objects are, in a photograph, much too bright, whilst green, yellow, orange, and red objects are much too dark. It follows that all photographs on ordinary plates of flowers, fruit, paintings, and similar objects are unsatisfactory, whilst in landscape work the foliage is much too dark, and has lost much of its roundness; water, reflecting the light from the sky, is much too bright, and a slight blue haze, almost imperceptible to the eye, is sufficient to blot out all the delicate details of the distance, on which the beauty of a view so often depends. In portraiture the flesh tints are much too heavy, and any freckles or similar defects become glaringly prominent.

To some extent these defects may be removed by interposing somewhere between the object and the plate a transparent yellow screen, which absorbs and cuts off the greater part of the blue and violet rays, and gives the green, yellow, and orange rays time to act, without any accompanying reversal. True values, however, can never be obtained in this way, because ordinary plates are always more sensitive to green than to yellow, and, moreover, the total sensitiveness to green, yellow, and orange is so small, that under these conditions the exposure requires several hundred times the ordinary exposure. The negatives, too, are usually very deficient in vigor.

Vogel found, in 1873, that by treating plates with certain coloring matters, and especially with certain coal-tar dyes, they can be made sensitive to the green, yellow, orange, and red, or, as we may term them collectively, the less refrangible rays. The value of eosin for this purpose was first pointed out by Waterhouse, in 1876, and Tailfer, in 1882, was the first to obtain useful results with gelatine plates, an end which he achieved by the simultaneous application of eosin and an alkali.

Subsequent experiments, and especially those of Eder, have shown that the only dyes of practical value are cyanin and the dyes of the eosin group. These may either be added to the emulsion or applied to ordinary plates in the form of a bath. In the first case the dye is either added to the materials before emulsifying, or to the melted emulsion before coating. According to Tailfer's specification it is necessary to add ammonia or some other alkali at the same time. In the second case the plates are immersed for a short time in a dilute aqueous or alcoholic solution of the dye, either with or without a certain quantity of ammonia. Sometimes the plate is immersed in a preliminary bath of very dilute ammonia, and sometimes it is washed after treatment with the dye solution, but neither of these courses is essential. A special modification of the bath method of sensitizing has been described by Ives, and will be referred to again later on.

My previous communications have dealt mainly with the comparative value of the various dyes of the eosin group, which is a somewhat large group; the efficiency of these and of cyanin, so far as regards obtaining true "values," and the relative merits of sensitizing in the emulsion or by means of a bath. I also exhibited the re-

sults of a number of experiments made with a view to ascertain the value of the methods from a practical photographic point of view. Stated as briefly as possible, the general conclusions arrived at were as follows: For all classes of work orthochromatic methods have considerable, and often very great, advantages over the other method. This, in fact, is generally recognized, and these methods are now widely and largely applied in the reproduction of paintings, in micro-photography, and in all kinds of work in which colored objects are dealt with. In landscape work their application is not so general, at any rate in this country, mainly, I believe, because the methods of working required to obtain satisfactory results are not yet generally known and diffused amongst photographers. Orthochromatic methods do certainly require more thought and skill than the ordinary method, and cannot be worked successfully in an unthinking and mechanical way. In the second place, I take it as established that although plates sensitized by means of a bath are somewhat, though not very much, inferior in keeping qualities to those sensitized in the emulsion, they have a much higher sensitiveness to the less refrangible rays. The testimony from many sources in favor of this conclusion is, in fact, overwhelming. Further, erythrosin, applied with ammonia, gives the highest sensitiveness at present obtainable, but the relative sensitiveness to green is too high and the values obtained are not quite correct; erythrosin without ammonia gives less sensitiveness, but somewhat truer values; rose Bengal with ammonia gives better values than can be obtained with any other single sensitizer, though the degree of sensitiveness is lower than with ammoniacal erythrosin; cyanin is the only dye of practical value as a sensitizer for orange and red, and should be used in conjunction with erythrosin, or, better, rose Bengal, for all objects in which orange and red are at all prominent or important. One of the most important results which I obtained early in my experiments was the fact that a very considerable degree of sensitiveness can be obtained with a bath of erythrosin or rose Bengal containing no alkali at all—with the first dye, in fact, applied simply in aqueous solution: the sensitiveness to the less refrangible rays is as great as that of the commercial isochromatic plates, which are prepared according to Tailfer's specification by adding the dye and ammonia to the materials before emulsifying. I understand that Mr. Bedford obtained a similar result when sensitizing in the emulsion. Another interesting result was that, contrary to the statements of some experimenters, I obtained the same sensitiveness with an ammoniacal solution of ordinary erythrosin as with a solution of silver erythrosin. This conclusion has been amply confirmed by the later and more extensive experiments of Professor Zettnow, published in *Phot. Correspondenz* in the early part of this year.

Lastly, with all methods of sensitizing at present known, the relative sensitiveness to blue and violet remains much too great, and correct values can only be obtained by using a transparent yellow screen to absorb and cut off the greater part of the blue and violet rays.

The bath processes having proved to be the most efficient, it seems desirable to investigate the various modifications which have been proposed, with a view to determine the best method of working. It was already known that the best degree of concentration of the bath depends on the nature of the dye to be used; that a bath too concentrated gives less sensitiveness; and that considerably greater sensitiveness can be obtained when an ammoniacal bath is used than with a simple aqueous solu-

tion. It was customary to treat the plates with a preliminary bath of plain ammonia of one or two per cent. It is stated in the Tailfer specification that it is better to add alcohol to the bath, and that the plates should be washed after treatment.

The English exploiter of this patent has indeed repeatedly asserted that this last part of the process is quite indispensable. Three points, then, require *quantitative* investigation, viz., the necessity for or advantage of a preliminary bath ; the influence of alcohol in the bath ; the necessity for or advantage of washing after treatment with the dye.

The methods of measurement were the same I described last year. The prepared plates were exposed for ten seconds to the light of the amyl acetate lamp at a distance of one metre, the plate being in contact with a Warneke sensitometer screen, immediately in front of which was a tank containing a one per cent. solution of picric acid two centimetres in thickness, which cut off all the rays more refrangible than the Fraunhofer line *b*. The plates were all developed together in the same dish, for three minutes, with a developer containing in each fluid ounce two grains of pyro, one grain of ammonium bromide, and four minims of liquor ammonia, .880. The details of the experiments are given in the following table. The plates used were Edwards's instantaneous and Wratten and Wainwright's ordinary. The dye was erythrosin, and with Edwards's plates the bath contained one per cent. of ammonia, and with Wratten's plates two per cent. No preliminary bath was used, and the time of immersion was two minutes

Dye.	Alcohol.	After-treatment.	Sensitometer. Edwards.	Wratten.
1:10000	None	Not washed	22	15
1:10000	5 per cent.	Not washed	22	14
1:10000	5 per cent.	Washed	22	13
1:10000	10 per cent.	Washed	22	13
1:10000	25 per cent.	Washed	22	12
1: 5000	5 per cent.	Not washed	25	13
1: 5000	5 per cent.	Washed	25	13
1: 5000	10 per cent.	Washed	25	13
1: 5000	25 per cent.	Washed	23	12
1: 2000	5 per cent.	Washed	25	15
1: 2000	10 per cent.	Washed	25	14
1: 2000	25 per cent.	Washed	24	13

A second set of experiments, with special reference to the preliminary bath, was made with Edwards's plates and Paget Prize Plates XXX.

Dye.	Preliminary Bath.	After treatment.	Sensitometer. Edwards.	Paget.
1:10000	None	Not washed	25—22	15—15
1:10000	1 p.c. ammonia	Not washed	23—22	15—15
1:10000	None	Washed	23	15
1:10000	1 p.c. ammonia	Washed	22	15
1: 4000	None	Not washed	22—25	15
1: 5000	1 p.c. ammonia	Not washed	23—24	15—15
1: 5000	None	Washed	25	15
1: 5000	1 p.c. ammonia	Washed	22	15

Both sets of experiments were, of course, made in duplicate. The slight deviations are due to the difficulty of accurately measuring the exposures with the amyl acetate lamp in its original form. Where two numbers are given the first was obtained with good commercial erythrosin, and the second with specially purified erythrosin.

The conclusions to be drawn from these results are—(1) Alcohol up to ten per cent. has no influence whatever, and may be dispensed with in all cases where the dye is soluble in water; alcohol in large proportion produces a distinct decrease in sensitiveness. (2) With a concentration of the dye up to 1:5000 the washing after immersion is quite necessary. (3) The preliminary bath may be omitted. It is further to be noticed that nothing is gained, at any rate with these three brands of plates, by increasing the concentration of the bath from 1 in 10,000 to 1 in 5000. I believe, however, that with plates which have been prepared with hard gelatine, or which have been treated with chrome alum, it is advisable to use the stronger bath, or to increase the time of immersion.

Ives's method consists in flooding the plate with an alcoholic solution (containing one grain in four ounces), allowing the alcohol to evaporate, and then washing with water. It was not easy to see why this method should give better results than simply immersing the plate in an aqueous solution of the dye. Photometric experiments confirm this supposition, They also confirm Ives's statement, that if the plate is treated with the strong alcoholic solution and not washed, no sensitiveness to less refrangible rays is obtained, doubtless because the alcoholic solution does not really penetrate the film. I was unable to get satisfactory results with cyanin in this way. I observed also that some films showed a great tendency to leave the glass altogether, a result due to the contractile influence of the alcohol. It is not at all improbable that the results will vary considerably with different specimens of gelatine.

Abney's method of sensitizing by means of a collodion or varnish film has completely failed in my hands.

It appears, then, that the best results are obtained in the simplest way, Dust the plate, immerse it for two or three minutes in a solution—

Dye solution (1:1000)	1–2 parts.
Ammonia (ten per cent.)	1 part*
Water	8 parts.

Allow the plate to drain for some time, place the lower edge on blotting-paper in order to take off the ridge of liquid which collects there, and dry in the dark in a pure atmosphere. Devolop in ruby light with a developer containing about two grains of sodium or potassium meta-sulphite per ounce, in order to keep the liquid clear, and thus enable the process to be more readily watched. As a rule, density is obtained more easily than with ordinary plates, and it is not necessary, and often not desirable, to have more than one grain of pyro in each fluid ounce.

C. H. BOTHAMLEY.

(*To be continued.*)

* I believe I ought to point out that the use of an eosine dye with ammonia in this way is covered by Tailfer's patent. The ammonia may be left out if erythrosin or rose Bengal is used, but three or four times the exposure will be required.

GREEN FOG.

(*Journal of the Camera Club.*)

THIS disease is so universal and unavoidable in photographic negatives, that it may veritably be considered as the measles of photographic childhood. Possibly some photographers may not know it, or fail to diagnose its symptoms, but it is certainly one of the commonest of the maladies that reap their harvest of destruction amongst our negatives. Nor indeed is the expert in any way entirely free from the pest, although by his superior knowledge he recognises his foe in its early stages and can minimise its disastrous effects.

The real cause of green fog has not, I venture to say, ever been completely explained, although a good deal has been written on the subject by some of our best workers. It is generally ascribed to a decomposition of the gelatinate of silver that is formed by the chemical union of the gelatine and silver salt in the making of an emulsion, and I think that it is undoubtedly due to an action on a salt different in its behavior from that with which the image is formed.

But what are the particular influences that cause this decomposition, or in what way they cause it, is not, I think, very clear. For some time it has been ascribed to the action of pyro-ammonia development, but I have seen some extremely fine specimens obtained by the use of ferrous oxalate, and have obtained it plentifully myself when using quinol in connection with ammonia.

As I have assumed that the presence of green fog is unrecognised by some, I am bound, although all my readers are, probably, as conversant with the enemy as myself, to describe its appearance. Green or dichromic (two-colored) fog is recognized first, when viewed by reflected light (that is, when the plate is held at an angle and the glass side of the negative looked down on), by the sickly greenish appearance of what should be the bare glass corresponding to the shadows in the view; secondly, by transmitted light (that is, when the plate is looked through at a bright light) these same parts appear of a yellowish-pink to a deep claret, and even purple, color. The surface of the film by reflected light is dull, and has a yellowy or verdigris-tarnished appearance, sometimes with iridescent marble-like markings.

All these symptoms are chiefly, if not entirely, seen in those parts of the negative that are represented by clear glass; that is, the dark shadows of the picture, and they are nearly always a concomitant of under-exposure, and therefore vigorous development. At the same time plates undoubtedly spontaneously develop the malady from long or bad keeping, and this is shown by the fog occasionally appearing only at the edges of the plate. Moreover, a plate thus affected by age is considerably slowed in its speed, and therefore more prone to receive under-exposure, and consequently be forced in subsequent development.

I have before me as I write some plates that were sent up by Messrs. Hinton for me to examine; I know nothing about them, neither whose they are, nor how they were exposed, nor how developed, but the green fog on them is of such a remarkable and instructive character that I have thought a few lines about them might be useful to my fellow members.

Examining first the glass side of the negatives by reflected light, the plate presents the appearance of a *negative*, instead of a *positive*, as is usually the case;

looking on the film side we also get a negative, the lighter-colored portions being formed by a powdery orange-colored deposit; otherwise the appearance of the film is normal, there being no iridescent markings or streaks.

Examined by transmitted light, first it is seen that the plate is greatly, indeed enormously, under-exposed; only the highest lights are in any way covered with a deposit of silver, and this is so slight that the light can pass almost freely through it; all the shadows are of a rich claret color, deepening in places to violet, almost indigo in fact, and this gradation of color so follows the details of the picture, that the negative, when viewed by transmitted light, appears as a *perfect positive*, the shadows being formed of different shades of purple and the high lights appearing quite white by contrast from the feeble retarding power of the deposit.

Now let us examine these negatives carefully; let us see how the image is formed. The high lights (I speak, of course, as seen by transmitted light) are caused by the *total absence of green fog;* the half tones by a certain quantity of it, and the shadows by its presence in the maximum quantity.

Now, since it is quite clear that the whole plate must have been uniformly or sensibly so affected by the influence that rendered it prone to give green fog, it necessarily follows that the action of light is antagonistic to or destroys the causes of the green fog. We see this fact most clearly demonstrated in the negatives in question; for wherever the light was strongest the green fog has been totally destroyed, or perhaps it is better to say prevented; proportionally as the action of the light in the shadows grows less, so does the fog increase, until, in those spots where its action is *nil*, the fog attains its maximum intensity.

Now it follows from this, that since latent green fog is destroyed by light, the causes that form it must have an opposite action on the sensitive film to that which light has. And if we assume that the action of light is a *deoxidising* one, and I think we can safely do so, the action that causes latent green fog is an *oxidising* one. The only other hypothesis would be that green fog, when very intense, had, like light, a reversing action on the film; but I think this is set aside by the fact that all cases of green fog are chiefly, if not entirely, confined to the under-exposed shadows;—at least such has been my experience.

Assuming then, that latent green fog is caused by an *oxidation of the film*, we can understand how the action of a strong developer, which is also oxidising in its action, may tend to cause green fog, but by what chemical changes this is rendered visible by the same developer I am not chemist enough myself to say; but shall hope that when Professor Meldola gives us another edition of his valuable treatise on photographic chemistry he will follow out the wily machinations of our subtle enemy. In the meantime, as a sort of corollary to the above, I would advise anyone who is troubled with green fog in a batch of plates to keep on increasing the time of exposure, which, if my deductions are correct, ought to quite do away with the enemy. As a second corollary I might state that, if the tendency to form green fog in a plate comes from the long keeping of the same, since light destroys this tendency it follows that if such plates be given a suitable preliminary exposure to actinic light, this tendency to form green fog would be destroyed; moreover, the plate would not be damaged by light fog, since the preliminary exposure would, if correct, have been entirely used up in destroying the latent green fog.

LYONEL CLARK.

LANTERN SLIDE MAKING.

A communication to the Birmingham Photographic Society.

TO some extent the amateur photographer is bound to admit that his long periods of seclusion in the dark room render his hobby a somewhat selfish one, at least so far as his non-photographic friends are concerned. How often I have been reminded of this I scarcely care to think. Happily for me, a lingering desire to possess an optical lantern became a firm resolve. The instrument once at home, the temptation to increase my limited number of slides was, of course, irresistible. On the conclusion of my first display the universal congratulations convinced me that my efforts were appreciated, and, strange to say, resulted in the withdrawal of all further opposition to "that dark room terror," as my sanctum was designated.

My knowledge of the "wet" negative process aided me considerably for a time; it formed the basis of my operations. I found, however, the deposit was coarse, and that a different developer from that used for negatives was necessary.

Fifteen years ago photographic literature, especially that suited to the amateur, was by no means plentiful, and one could often seek in vain for information now afforded in every elementary handbook. This led to experimenting and careful observation on my part, and I believe that schooling was very beneficial—so much that I cannot but regret the meagre superficial knowledge possessed by the average amateurs of the present day.

Let us consider the requisites of a good lantern picture. First, of course, comes artistic composition, the arranging of the subject in such a manner that as the eye wanders over it its beauties continue to grow, and the imagination receives an unalloyed feast of satisfaction and pleasure. To some extent I think it possible to teach the art of composition—at all events so far that its simplest canons may escape violation—but the capacity of rendering true art is a gift of nature. Secondly, the technical excellence of the picture, its mechanical production—upon which, with your permission, I shall address you this evening.

The wet process, properly understood, I believe it is generally admitted, yields the best results in many cases. That it is at times a somewhat troublesome process I frankly admit, still, with care and observation its difficulties can be overcome. I shall treat of the collodion process only, leaving that of albumen for a future paper. Collodion (that is pyroxyline dissolved in ether and alcohol) forms the vehicle to receive the sensitive salts, and a collodion that has been iodised some time is necessary, otherwise the high lights of the pictures will suffer. Thin glass cut to the standard size is taken, and after standing some time in sulphuric acid and water it is carefully dried with a cloth free from soap or other grease. One side of the glass is then coated with the following solution, which must first be filtered through filter paper:—

White of one egg, well beaten.
Ammonia liquid .880 . . . . 1 ounce.
Water (according to quantity of albumen) . . . . 15 to 20 ounces.

The coating is performed by pouring a small pool in the centre of the plate, then gently inclining it so that it runs to each corner;—the excess may be thrown away.

So soon as the plates are dry they are ready for use. With a soft brush carefully dust the prepared surface, flooding it with collodion in a similar manner, but returning the excess to the stock bottle. This is to avoid dust, a serious enemy. During the draining the corner should be kept in contact with the bottle, and the plate gently rocked to avoid a streakiness or uneven setting of the collodion. Directly it is sufficiently set (the best test for which is trying the upper corner with the finger) it is steadily and evenly lowered into the sensitizing bath by means of a dipper.

A good bath for lantern slides is made as follows :—

Pure nitrate silver recrystallized	40 grains.
Water distilled	1 ounce.

Rendered slightly acid with C.P. nitric acid, one or two drops of which will be sufficient for 12 ounces of solution.

When the bath is mixed, for each twelve ounces add half an ounce of the iodised collodion and shake very thoroughly, let stand a couple of hours, then filter. The bath should now be quite clear and in good working order, but may occasionally be placed in the sun for a few hours and afterwards filtered, when it will work cleanly until the silver is exhausted.

When the plate has been in the solution about two minutes it should be slightly moved to help the escape of the solvents, and in about four minutes may be examined by yellow light. If the surface is free from greasy lines it is ready for exposure in the camera.

A good negative is necessary for a successful slide. It should be "plucky," so as to admit of a fair exposure.

A good developer is made as follows :—

Protosulphate iron	½ ounce.
Acetic acid	2 ounces.
Honey	1 ounce.
Alcohol	¼ ounce.
Water	16 ounces.

Use plenty of developer, and cover the plate in one even wave; never mind spilling a little, but practice will enable you to avoid this. As soon as all detail is well up, thoroughly wash and intensify with—

Pyrogallic acid	24 grains.
Citric acid	24 grains.
Acetic acid	¼ ounce.
Water	24 ounces.

Enough to cover the plate is taken, to which, immediately before use, a few drops of the silver bath is added.

Do not intensify, as the picture does not lose much in fixing, for which operation hyposulphite of soda may be used on the ground of safety, but cyanide of potassium acts more quickly and perhaps more cleanly. Slides by this process are a good color, and do not need toning. A coat of clear varnish improves the transparency of the shadows. The apparatus for lantern slide making, patented by our member, Mr. W. Griffiths, is very handy and cheap. I have one here for your inspection. The slideholder requires to be made in wood with silver wire corners to adapt it to the wet process.

I am quite aware that the dry plates now made for lantern slide purposes are very popular, and I think most of them deservedly so. Personally, I use a lot of Messrs. Fry's, Mawson's, and Thomas's. My various sets of Norwegian slides, numbering some hundreds, are made upon them, and I will next show you the methods of development most successful in my hands.

Whether printing in contact or by means of the camera, I strongly recommend a full exposure. Gelatine plates are sure to show fog if forced, and however slight that may be it should insure their immediate rejection. Indeed, it is well to select a really good slide as a standard both as to density, tone, and clearness in the high lights, and those that do not come up to it should not be kept.

For dry plates I prefer a soft negative full of detail. If the skies are not sufficiently opaque they must be stopped out.

The solutions required are ten per cent. ones of the following:—Pyrogallol, bromide of potassium, ammonia, carbonate of ammonia, and carbonate of potash.

The pyro is mixed as follows:—Four ounces of sulphite of soda are dissolved in boiling water and rendered acid with citric acid. The pyro is then added, and the whole made up to ten ounces with water.

The other chemicals are simply mixed with water, and all will keep well. A developer giving a beautiful purple tone with Mawson's and Thomas's plates is—

Pyro solution	30 minims.
Bromide	30 minims.
Ammonia	30 minims.
Carbonate ammonia	30 minims.
Water to make up to	1 ounce.

The same color can be obtained with Fry's plates by slightly increasing the exposure and bromide, while a fine engraving black is got by shortening the exposure, increasing the ammonia, and leaving out the carbonate of ammonia.

Sepia is obtained by full exposure and using carbonate of potash or soda in place of ammonia, but some makes of plate will not yield the sepia tone.

While the plates are developing keep them in motion; it adds to their vigor, and prevents flatness, and also deposit settling upon them.

After fixing and moderately washing they may be cleared in—

Alum	2 ounces.
Citric acid	½ ounce.
Water	10 ounces.

The addition of two ounces of protosulphate of iron and a quarter of an ounce more of citric acid will considerably moderate the tone, and by slightly reducing the slide increases the clearness of the high lights. If any deposit appears upon the surface rub gently with the finger or a tuft of cotton wool. The slide is now well washed, allowed to dry slowly away from dust, and then varnished.

I will now proceed to make several slides, which I will afterwards exhibit on the screen by means of the oxyhydrogen lanterns, and show the various tones obtainable by the variation of the developer. The results both by wet and dry process, you will see, are equally good.

E. H. JAQUES.

"ALLOTROPIC SILVER."

From the American Journal of Science.

THE three forms of allotropic silver which were described in the June number of this JOURNAL—the blue soluble and the blue and the yellow insoluble—are not to be understood as the only forms which exist, but as the best marked only. The substance is protean, and exhibits other modifications not yet studied. No other metal than silver appears to be capable of assuming such a remarkable variety of appearances. Every color is represented. I have obtained metallic silver blue, green (many shades of both), red, yellow, and purple. In enumerating these colors I do not refer to interference colors produced superficially by reagents, also wonderfully brilliant, but to body colors. As a single instance of coloration the following may be mentioned. I recently obtained a solution of allotropic silver of an intense yellow-brown. A little solution of disodic phosphate changed this to bright scarlet (like Biberich scarlet), presently decolorizing with formation of a purple precipitate. Washed on a filter this changed to bluish green. The colors I have met with in this investigation can only be compared with the coal-tar products, of which one is constantly reminded by their vividness and intense colorific power.

Two of the insoluble forms of allotropic silver, the gold-colored and the blue, show in many respects a close relationship and almost identical reactions. There are other respects in which they differ strikingly, and amongst these instability. Blue allotropic silver (dark red whilst moist, becoming blue in drying), is very staple. It may be exposed for weeks in a moist state on a filter, or be placed in a pasty condition in a corked vial, and so kept moist for months without alteration.

The gold-colored form, on the contrary, tends constantly to revert to ordinary silver. This is especially the case whilst it is moist, so that from the time of its formation it must be separated from its mother water, and washed as rapidly as possible, otherwise it loses its brilliancy and purity of color, and changes to a dark, dull, gray form of normal silver. On the filter its proper color is pure black, with a sort of yellow shimmer (the gold color appearing as it dries); often, especially if allowed to become uncovered by the water during washing, it will change superficially to gray.* But if the washing is done rapidly, with the aid of a filter pump and a pressure of four or five inches of mercury, the allotropic silver obtained, when allowed to dry in lumps, or brushed over paper or glass, is at least equal to pure gold in color and in brilliancy. With the blue powder such precautions are wholly superfluous.

Of the facility with which the gold-colored form is converted into normal silver, I have recently had a somewhat singular proof. I brought with me to my summer home a number of specimens in tubes, some recently prepared, some dating back as far as ten and a half years, together with other tubes containing specimens of white silver spontaneously formed from the gold-colored. On opening the box no tubes of gold-colored silver were to be found; all had changed to white. But the same box contained pieces of pieces of paper and of glass on which the same material had been extended; these were wholly unchanged, and had preserved the gold color

* When well washed, this form can also be preserved for a time in the moist condition in a corked vial, as I have lately found.

perfectly. Apparently the explanation was this—the mere vibration caused by the jarring of a journey of six hundred miles by rail and steamboat had had no effect in changing the molecular form, but the material contained in the partly filled tubes had been also subjected to *friction* of pieces moved over each other, and this had caused the change. To verify this explanation I prepared fresh material, filled three similar tubes, each one-quarter full, but in one forced in cotton wool very tightly to prevent frictional motion. These tubes were packed in a small box and sent over two thousand four hundred miles of railway. The tubes with loose material came back much altered. One was nearly white, and, as the change has been set up, will probably in a few days be entirely so ; * another with loose material was also changed, but not as much as the first mentioned. The tube filled up with cotton came back unaltered, so that continued friction of pieces sliding over each other will cause a change to take place in a few days, which otherwise might have required years, or might not have occurred at all. The permanency of this substance is greatly influenced by moisture, so that when simply air-dried before placing it in tubes it is less permanent than when dried at 70° or 80° C. in a stove. Tubes placed in the same box containing the blue form remained unaffected by the motion, though only partly filled and allowed to move freely.

When gold-colored allotropic silver is gently heated in a test tube it undergoes a remarkable change in cohesion. Before heating, it is brittle and easily reduced to fine powder. After heating, it has greatly increased in toughness, and cannot be pulverized at all.

Both the gold-yellow and the blue forms resemble normal silver in disengaging oxygen from hydrogen peroxide. These two forms, though differing so much in color and stability, and differing also in specific gravity, and in their mode of formation, have many properties in common, not possessed by ordinary silver, and differentiating them strongly from it. They show a vastly greater sensitiveness to re-agents, and are also sensitive to light. The ability to form perfect metallic mirrors by being simply brushed in the pasty condition over glass was mentioned in a previous paper.

Many substances which react little, if at all, with ordinary silver, attack the gold-colored and the blue allotropic silver with production of interference of two reflected rays. In my previous papers I called this the "halogen reaction," because first obtained by the action of substances which easily parted with a halogen. But I have since found that many other reagents will produce the same or similar effects. These are :—

Sulphides.—Paper brushed over with either the gold, the copper-colored, or the bluish-green substance exposed to the vapor of ammonium sulphide, or immersed in a dilute solution of it, assume beautiful hues, though less brilliant than those obtained in some other way.

Potassium Permanganate in dilute solution produces blue, red, and green colors.

Potassium Ferricyanide in moderately strong solution gradually attacks allotropic silver with production of splendid blue, purple, and green coloration.

Phosphorous Acid produces gradually a rather dull coloration.

The color reaction is produced finely by substances which readily part with a halogen—such as ferric and cupric chlorides, sodium hypochlorite, hydrochloric acid

* Has since become so.

to which potassium bichromate has been added—and by corresponding bromine and iodine compounds. In some earlier experiments I obtained effects of the same sort, but in much weaker degree, with alkaline haloids. But with purer products the results have been different. There is at first some darkening, but no true color reaction, and the allotropic silver appears to be gradually converted into normal, so that it is no longer capable of giving the brilliant color reaction with potassium ferricyanide, but, like normal silver, takes a pale and faint coloration only.

The perchlorides of platinum, gold, and tin do not give the color reaction, though by analogy one would expect that they should, since they can lose chlorine with formation of a lower chloride.

Action of Light.—In a previous paper was mentioned the remarkable fact that the gold- and copper-colored forms of allotropic silver can be converted first into yellow, and finally into white normal silver by the continued action of light. The earlier specimens of the blue form became brown by exposure, but purer ones since obtained are likewise converted into yellow by exposure, becoming continually lighter as the action is continued. The conversion from the darker shades to a bright yellow, with full metallic lustre, is very easy, but when the previous paper was written I had been only able to obtain the white by keeping the paper on which the silver was coated moist by a wet pad, and by exposing for five or six days. Since then I have obtained the gold-colored silver in a more sensitive form, giving a perfectly white product by exposure dry for half that time.

The white silver thus obtained has all the character of ordinary silver, and does not show the color reaction with ferric and cupric chloride, potassium, ferricyanide, etc. Just in proportion to the exposure to light the ability to give this color reaction diminishes, so that after a day's exposure, when the exposed part has become bright yellow, the color reagents scarcely affect this yellow, whilst the protected part becomes intense blue, purple, or green. In this way it is easy to observe the gradual effect of light as it changes the allotropic silver, finally converting it into what resembles in every way and is undoubtedly ordinary silver.

M. CAREY LEA.

ON RING SYSTEMS AND OTHER CURVE SYSTEMS PRODUCED ON ALLOTROPIC SILVER BY IODINE.

ALLOTROPIC silver, in its moist and plastic state, may be brushed over paper, and gives, on drying, a continuous and brilliant coating resembling metallic leaf. When a small crystal of iodine is placed on paper that has been thus coated, a system of colored rings of remarkable beauty is obtained. A funnel or breaker should be inverted over the paper to prevent distortion by irregular currents of air. One form of distortion, however, produced by a slight current in one direction, gives interesting results. If the paper with the crystal on it is set near a closed window, the slight current which makes its way through affects the air under the glass enough to carry the iodine vapor principally in one direction, and there result oval or pear-shaped curves of great elegance and much variety, according as the air currents are stronger or weaker. Another method is to place a bell glass, not fitting too closely,

over the paper, and set it where it will be influenced by the draught created by a fire, or even a gaslight.

That iodine is capable of producing interference rings (Nobili's rings) on metallic surfaces has long been known, and Robert Hunt has described their formation on surfaces of normal silver. I have made these for comparison—pressing gummed paper on silver leaf, bringing to a smooth surface by gently rubbing after drying. The contrast between the pale and faded-looking effects produced on normal silver, and the lustrous and glowing hues given by the allotropic, is very striking. One cannot help wishing that this splendid coloration could be made to do service for obtaining natural colors by photographic process.

As to the durability of these products I cannot yet speak with positiveness. Protected from light and air they endure for several months at least. Both the bluish-green insoluble silver B, and the gold-colored C produce these effects; the gold-colored is the better suited of the two.

M. CAREY LEA.

THE PHOTOGRAPHIC SOCIETY OF PHILADEPHIA.

A STATED meeting of the Society was held Wednesday evening, October 2d, 1889, with the President, Mr. Frederic Graff, in the chair.

The Committee on Lantern Slides reported that at the September Conversational Meeting slides were shown by Messrs. Bradway, Pim, Rolfe, Ennis, Rau, Walker, and Rosengarten. These shown by Mr. Walker were a fine series of views in St. Augustine. Mr. Rosengarten had a good photograph of the U. S. S. *New Hampshire*, Mr. Rau some Boston views, Mr. Ennis marine subjects, and a number of slides representing Mexican scenery from negatives by Dr. Jordan were also shown.

On behalf of the Joint Exhibition Committee, Mr. Bullock asked for an expression of opinion as to the desirability of continuing the agreement, and also in regard to the adoption of a medal for distribution at future exhibitions in place of the diplomas heretofore used.

On motion of Mr. Wood, it was resolved that the Society express its approval of the continuation of the agreement for another term of three years, that Messrs. John G. Bullock, Robert S. Redfield, and Samuel M. Fox be appointed to represent the Society in the Joint Exhibition Council, and that they be authorized to take such action as may be necessary towards the adoption of a suitable medal in coöperation with the other Societies for distribution in connection with future exhibitions.

A paper on the new developing agent known as "Eikonogen" was read by Dr. Mitchell.

Referring to the statement that the solution was green in color, Mr. Bullock remarked that the pure aqueous solution was pink, and that the green color was induced by the sulphite of soda contained in the developing solution.

Mr. Walmsley spoke most favorably of the new developer, stating that he had used it without the addition of any alkali with excellent results.

Mr. Bullock thought this was owing to the presence of some carbonate of soda in the sulphite.

Mr. Wood had found difficulty in correctly timing the exposures of transparencies on slow gelatine plates, but with plates as rapid as Cramer's 50's, at a distance of ten to fifteen feet from the source of light, he had obtained excellent and certain results with about one second's exposure.

Messrs. Rau and Dillon questioned whether a desirable color could be obtained with such rapid plates.

Mr. Supplee called attention to some plates he had recently seen coated with an opaque varnish for use in that species of etching in which a glass plate forming a negative was used, instead of a copper plate and the usual process of biting by use of acid. The process was similar to that in use for twenty or thirty years, in which a plate was coated with collodion, sensitized, exposed, and developed, and then used as a surface on which to operate with an etching needle.

Adjourned.

ROBERT S. REDFIELD, *Secretary.*

FALSE RENDERING OF PHOTOGRAPHIC IMAGES BY THE MISAPPLICATION OF LENSES.

(*Read at the Photographic Convention of the United Kingdom.*)

PORTRAIT Lenses.—A good many rules have been laid down in order to obviate the shocking examples one often comes across in portraiture, as well as in "wide-angle" pictures, and I have thought it well to explain the cause of these failures, and to endeavor to arrive at a sure means of preventing the bad results thus produced. In portraiture it was advised many years ago that in taking a portrait of a given size the focal length of the lens employed should be at least double the largest dimensions of the image. This rule was laid down to avoid as far as possible false rendering in perspective.

To start on first principles, take a case of a large head, life-size. It is well known to you that in taking such a portrait the camera must be wheeled out to double its equivalent focal length, and the subject placed at the same distance on the other side of the optical centre of the lens. This particular distance, viz., double the focal length of the lens, holds a very important position in its relation to the law of conjugate foci, in that any other point nearer than this will produce an enlarged image upon the screen, and that any point more distant than this will be represented by a reduction in the size of the object; hence, if the eye of the sitter be focused for full face, the nose of an ordinary person projecting in front of the eye must necessarily be enlarged, and the ear, further away, must be reduced in scale. By what is called *straining* a lens, these effects of contrast become more and more apparent, and hence it is that although there is a drawback in using long-focus lenses on account of their lack of depth of focus, still, the longer the focus of the lens employed, in the given case of portraiture, the better, in that these contrasts are not so marked.

To repeat what is deduced from this generally, it is apparent that the more a lens is strained, *i. e.*, used under conditions farther away from those for parallel rays, or giving it a temporarily lengthened or forced focus, the more pronounced will be the

false rendering. As an example of this, I have in my possession a number of old *carte-de-visite* photographs that were taken when the *carte-de-visite* was originally a rage in this country, and, I believe, first taken up by the late Mr. T. R. Williams. In these *cartes-de-visite* most of the subjects are full-length figures, and placed at such a distance from the *carte* lens that there was hardly a perceptible difference between the focus for the subject and the focus for parallel rays. Since that time, I do not say invariably, but in *cartes-de-visite* taken with lenses of the same focus, there has been a strong movement toward having much larger heads, accordingly bringing the subject very much nearer to the lens, and when this is the case the palpable difference in the conjugate point for the foreground and the background necessarily gives upon the plate an exaggerated perspective. This is sometimes an artifice of the photographer to flatter, for we have all often seen hardly recognizable portraits of thin-faced subjects that have come out comparatively full-faced, simply due to pushing the short focus lens close up to the sitter.

It appears, then, that for ordinary portrait work it is best to limit the amount of angle taken in as far as possible by employing lenses whose foci are at least twice the length of the image, and also to have the subject at such a distance that there is not a too remarkable difference between the corresponding conjugate points of the fore and backgrounds. While speaking on this head, it follows that, theoretically, an enlargement from a portrait taken under the most favorable circumstances, is truer in drawing than a direct large head. This arises from the fact that in making the small portrait, taking it for granted that all the rays are practically parallel, they are received accurately upon one plane.

I do not propose to discuss here the *pros* and *cons* of direct large heads as against enlargements, for there are many other reasons coming in, which, at the expense of theoretical benefit, have proved that a direct large head, when taken under the most favorable circumstances—that is, with a lens of long focus—is undoubtedly much more pleasing than an enlarged small image.

View Lenses.—The whole of false impressions given in views, outside the question of imperfectly corrected lenses, hinges on the point of the amount of angle that is allowable to be included on a given size of plate. I have once before pointed out that, from a scientific point of view, a theoretically perfect instrument would be a pin-hole camera having the section of a mathematical straight line for an aperture. Such an instrument would give any amount of latitude in focus and angle of subject included. At a given distance the image or impression received upon the plate thus obtained must of necessity be absolutely correct from the one point of sight, but that it be a true rendering of the subject in the image thus obtained from the ordinary distance of vision does not follow at all. Such an instrument can do what the eye of itself can never do. For example, the whole horizon of 360°, by a very short focus arrangement, could very nearly be taken in two views of angles approaching 180° each. To imagine the result is somewhat difficult, but as the eyes cannot take in without movement more than from a quarter to a third of the 180°, the subject thus taken would hardly be recognizable from the ordinary distance of vision.

In this connection the correct amount of angle to be included is, then, the point to be settled. With regard to views, as well as in portraiture, rules of thumb have been laid down, and the reason for this is only due to the desire to make it impossible

for the lens to include angles which the eye of itself cannot possibly take in. I think it may be taken for granted that no picture should include an angle of more than 60°, and it would be safer still never to employ a lens of shorter focal length than the larger dimensions of the plate, or slightly over 50°; but it is very evident that the longer the focal length of the lens compared to the greater dimension of the plate, the more pleasing will the perspective become, provided there is sufficient subject of interest thus included. The ordinary distance of vision is about fifteen inches, and at fifteen inches I am of the opinion that the most pleasing size of picture would be about 10x8 inches, but not exceeding 12x10 inches. If, then, it can be decided once and for all what is the extreme amount of angle to be included, and this, or always less, included, we shall never be pained by seeing pictures that, if they are true in drawing from the point of sight of the lens itself, are nevertheless distinctly untrue from the distance of ordinary vision. Taking numerous cases of the falsely-rendered results one sees of architectural subjects and interiors on the one hand, and "wide-angle" landscapes on the other, where the distance is dwarfed, and does not hold its true value compared to the foreground, it should be borne in mind that if those views could be comfortably viewed at the distance of the focus of the lens they would be true, but angles of 70° to 100° it is impossible, without movement of the head, to appreciate even at that distance. There are other subjects in connection with artistic treatment of subjects where the form and construction of the instruments employed necessarily come in. Some are self-evident, such as distortion and imperfection in correction for other than central pencils, which of themselves will necessarily give untrue rendering in the structure of the image. Putting a lens entirely out of focus, must necessarily destroy structure, but the introduction of spherical aberration in many instances may still maintain the structure of the image, but produce a softer effect. I think that this is the only legitimate form of aberration to soften images, although I maintain, at the same time, that a perfectly well-defined or sharp picture throughout is not of itself at variance with softness due to conditions of atmosphere and lightning, the latter remark being, I think, particularly applicable to studies of landscape without prominent figure.

In subject photography in combination with landscape, the employment of a long-focus lens has an important bearing from the standpoint of some of our leading artists, in that the main object or subject of interest focused for is better defined than either foreground or background, which are subservient and lead up to the main feature, this, of course, being dependent again on the position of the conjugates. To obtain truer values also with the long-focus lens in *landscape work*, the subject chosen for the foreground should be sufficiently distant for the correct amount of definition for this to be consistent with that of the most extreme distance or parallel rays. This is often easily attained with large aperture, but if the limits are wide, it can only be arrived at by the use of diaphragms.

Another important feature in the employment of long-focus lenses is that it is always much more easy to attain equality of illumination for the whole of the plate, and in this way allow for every part of the subject to receive its full share of light to the extreme edges of the plate, thereby allowing true values in light and shade.

I have continually used the word long-focus in respect to view lenses, but by long-focus I simply wish to be understood to mean long-focus in the sense of com-

parison to the base of the plate that it is worked upon. No matter what the form of lens, on a given plate all lenses of identical focus would give exactly the same rendering of *perspective*. By the optician, lenses are designated "wide-angle," "narrow-angle," etc., merely from the fact that according to their name it is possible to use them under circumstances for which they have been particularly designed. Records of buildings and interiors, and wide-angle views, are, of course, interesting in their way as mementos, and lenses are constructed to enable photographers to obtain results that cannot otherwise be obtained by using lenses for their truest rendering.

In conclusion, I would only impress once more upon you that the so-called wide-angle lens should never be employed to its full extent where it is possible for the subject to be treated by a so-called "narrow-angle" or long-focus lens, or the "wide-angle" lens under such conditions that it *practically* is a narrow-angle one.

THOMAS R. DALLMEYER.

DISCUSSION.

Mr. Beck said that a point which was sometimes overlooked by photographers was that when photographing or copying life-size, the focus of the lens at that near distance does not materially affect the depth of focus.

Mr. Taylor (Leicester) agreed as to the need for long-focus lenses for all portrait work, but he thought there was a distinction between portrait and landscape work. Portraits were records of facts, and, therefore, care had to be exercised to be truthful, but views were not always records of tacts, and circumstances might arise when a better picture could be obtained by using a wide-angle lens. As to the question of depth of focus he would remark that the depth does not so much affect the subject with long-focus lenses as had been suggested, as the object is much further off.

Mr. Gotz said that the wide-angle lenses not only gave violent perspective, but actually distorted by giving the inner portions of the picture more correctly than the outer. Objects at the margin of such a picture were given an incorrect form. With too wide an angle, in portraiture, say, grasp of figure was lost; the oblique rays, so to speak, shaved it.

The President said Mr. Dallmeyer had treated a very important subject in a very able way. There was much mischief done, particularly in professional portraiture, by the use of too wide an angle. Photographers were too apt to use their *carte-de-visite* lenses for cabinet portraits. There was too great a run after wide-angle lenses.

Mr. John Stuart asked what length of focus should the lens have for life-sized heads? Some objections were felt for enlargements.

Mr. Dallmeyer, in reply, said that if only a small picture be taken, theoretically the drawing is truer. The longer the focus the better for the picture. He could not accept Mr. Beck's statement in regard to the length of focus not affecting the depth at near distances.

DESENSITIZING AND RESENSITIZING ALBUMENIZED PAPER.

[*Read at the Photographic Convention of the United Kingdom.*]

I MUST at the very outset apologize for appearing before you with such a paper as I have in hand; but the fault is not mine—the responsibility rests with others than myself. On the 24th of July of this year, I made a few remarks on this subject before the London and Provincial Photographic Association, the task having been kindly thrust upon me by our worthy friend and past President, Mr. J. Traill Taylor, and on resuming my seat after the few words, I was told by him that I should be expected to read a paper before you on this same subject this evening.

The object of the few experiments I have been making is to ascertain whether it is possible to thoroughly desensitize paper which has been made sensitive to light, and again resensitize it so as to obtain passable prints from such paper. Had I made my experiments first I should not, most probably, have chosen the title that appears at the top, because as far as I have gone none of the ordinary reagents that I have employed deprive the paper entirely of its sensitiveness to light. The rate at which it prints is very much modified, and, as a rule, the slower the printing the less satisfactory the result.

The paper I employed, and which I shall call normal paper, was prepared as follows: Ordinary albumenized paper was floated for three minutes on a fifty-grain to the ounce solution of nitrate of silver. Four sheets were thus treated; after the last sheet had been floated the solution was returned to the bottle and the dish washed out, and then about three pints of distilled water was poured in; each sheet was floated on this for about three minutes: this water was then poured out and replaced by a fresh three pints, and the washing by flotation repeated. The paper was after each floating thrown over some blotting-paper on a line, albumenized surface upward. This was done on Saturday morning; in the evening, when the paper was thoroughly air-dry, each sheet was folded into four quarters and placed in a 12 x 10 printing-frame.

The printing was done on Monday and Tuesday, so that the paper was kept about seventy-eight hours between the sensitizing and toning.

The first thing to ascertain was what kind of print could be obtained from this, my normal paper. It printed but slowly, and the finished result is not very satisfactory.

In most cases I have printed from two negatives paper treated in identically the same manner. One of these negatives takes twice as long to print as the other.

My next experiment was to try the effect of fuming, *i.e.*, of subjecting the normal paper to the influence of ammonia gas either previous to or during the printing. Two pieces of paper were placed in a box containing ammonia in a saucer, and left there for about twenty minutes, and then printed; the results yielded in this case are far in advance of the normal paper. In order to fume the paper during the printing, I took a whole sheet of blotting-paper and folded it so that it was eight thicknesses, and then, having unfolded it, placed it in the fuming-box for about a quarter of an hour; at the end of that time it was again folded, and at once placed in contact with the back of the normal paper which had already been adjusted on the negative.

The result in this case is intermediate between the non-fumed and the fumed. In order to prevent the too rapid escape of the ammonia from the fumed blotting-paper or pad, a piece of paraffined paper was placed between it and the back.

Finding that the simple washing of the paper had only partly desensitized it, I was curious to ascertain what would happen if the whole of the pure nitrate of silver were removed from the paper before printing. In order to effect this I washed the normal paper in three changes of water for about four or five minutes each, and then immersed the paper in a solution of chlorate of sodium (common salt). It was again washed in a couple of changes of water, and then dried. The print obtained in this way was very poor, indeed, in fact the most unsatisfactory of all. I then fumed the other piece that had been thus treated, and though it gave a better print, the result is far from satisfactory.

Citrate of soda has frequently been recommended as a preservative when applied to the back of the sensitive paper, but, as far as I am aware, no one has shown what its influence is on the quality of the resulting print, or on the time required to produce a sufficiently deep impression. I therefore treated some of my normal paper with a ten per cent. solution of the neutral citrate of soda back and front, and in order to find out how such paper would print fumed and unfumed, instead of printing two separate pieces under each negative, I covered one-half of the paper when placed on the negative with paraffined paper, and then I placed on the whole pads of blotting-paper which had been fumed. The portion subjected to the action of the ammonia gave a slightly better image, but the difference was not so great as I expected. A better result would most probably have been obtained had the paper been actually fumed instead of the pads. It was in consequence of this result that I thought it would be better in future to fume the paper before printing, instead of doing it during the operation. The time required to produce a sufficiently dark print was much longer than with the normal fumed paper.

At our last meeting in Birmingham a paperwas read on behalf of Mr. Watmough Webster, on the preservation of sensitized paper by means of paper impregnated with dry carbonate of soda, and I thought it might be useful to ascertain the effect of this salt when actually in the paper before and during printing. The results I have obtained on paper treated to a ten per cent. solution of the salts are not very good; the prints are what one usually calls *mealy*, and I noticed that those pieces whose backs were floated on this salt became very absorbent, resembling very much certain brands of ready sensitized paper which one comes across at times. Two pieces I fumed before printing, and the results obtained by this method are, I think, equal to the very best that I have obtained by any of the treatments to which I have subjected the paper. In several cases I floated the front of the paper only on the salt in solution, in others I treated the fronts of some and backs of others to the salt in order to see what the difference is, and in the case of the carbonate of soda treated paper the result is decidedly in favor of the back being treated and fumed afterwards.

Rochelle salt (double tartrate of potassium and sodium) has frequently been recommended in different formulæ for printing-out papers, and Mr. J. Barker was, I think, among the first to work out a printing process in which gelatine was used as the vehicle and tartrate of silver as one of the sensitive compounds, and I therefore thought that some useful information might be obtained by treating paper with a ten

per cent. solution of Rochelle salt, as undoubtedly the remaining free nitrate of silver would be converted partly into tartrate. The prints produced on the paper thus treated are poor and mealy, but when the paper has been fumed the results are very satisfactory.

The last set of experiments I made was to treat the paper with nitrate of potash, a salt which I think Captain Abney has at different times recommended in conjunction with others as a preservative. In all cases when trying the effects of salts as preservatives, the first consideration ought to be the effect it has on the image independent of its preserving action. In the case of nitrate of potash I find it to improve very considerably the quality of the resulting print when used by itself. I do not know whether this is due to the nitrate or to the fact that this is an alkaline salt, and the alkaline nature of the salt may have acted beneficially. When fumed with ammonia there is not such a marked difference as in the other cases. Nitrate of potash, therefore, seems to confer a quality on the paper not possessed by the paper when treated with any of the other salts I have employed. At the meeting of the London and Provincial Photographic Association it was suggested that I should see what could be produced on paper prepared in the same manner as the other but unwashed, and I have therefore added to the series of prints one from each negative on plain, freshly sensitized paper.

When time will allow I propose continuing these experiments so as to find out the effects of other salts on washed paper, and, if possible, to work out as regards their preserving action those which are the most promising.

A. HADDON.

LITERARY AND BUSINESS NOTES.

TRAITE ENCYCLOPEDIQUE DE PHOTOGRAPHIE. By C. Fabre, D.Sc. Published on subscription by Gauthier-Villars et Fils, Paris.

When completed this work will form four handsome large octavo volumes, profusely and beautifully illustrated. It is published in parts of 80 pages each, five parts constituting a volume. Subscription to the four volumes, 40 francs,—10 francs to be paid on the publication of the first part of each volume,—each part separately 2.50 francs. Volume I. will be devoted to the history of photography, and the materials used in photographic processes, particularly the lens. Volume II. will consider the sensitive plate, and all the means employed for obtaining negative images. Volume III. will deal with the process of producing positives, and Volume IV. will contain descriptions of enlarging, the scientific applications of photography, and the hypotheses which account for the formation of photographic images.

Four parts have already appeared, the following being a brief synopsis of their contents:

The introduction, of twenty-four pages, with a history of observations on the chemical action of light, especially on the salts of silver. The discoveries of Niepce, Daguerre, Talbot and Bayard are described in historic order, with due mention of the improvements suggested by other investigators, and clear and brief paragraphs trace the historic development up to the modern process for the reproduction of prints. Chapters are then devoted to the production of luminous images, the theory and manufacture of lenses, and the construction of photographic objectives. Then follow descriptions and explanations of all the forms and combinations of lenses employed in photography, and the peculiar adaptabilities of each, together with tables showing the relations between the diameters, focal length, and surfaces covered by each kind of lens, and apertures to be employed.

Shutters next claim attention, and all forms from the simple guillotine or slide to the Iris diaphragm in all its modifications are described and illustrated by detailed drawings. A simple general formula is given by which the efficiency of exposure may calculated for each shutter.

The camera box and its appurtenances are then taken up, all important modifications in the construction of cameras being described, including stereoscopic and panoramic cameras, and the hand cameras with fixed focus. Single and multiple plate holders and roll holders are described and fully illustrated, as are also the various forms of tripod and stand for field and studio use. The fourth part concludes with the methods employed for testing the condition and accuracy of camera boxes and lenses.

Other parts of this important work will be brought to the attention of our readers as they are published.

THE *Optical Magic Lantern Journal*, published in London, England, under the direction of Taylor Bros., continues to furnish the most excellent matter relative to the management of the Magic Lantern, the manufacture of slides, etc. We quote the following from the interesting series of papers entitled, The Magic Lantern, Its Construction, Illumination, Optics, and Uses. "Sciopticon Lantern.—It is to Mr. L. C. Marcy of Philadelphia that we are indebted for the greatest improvement that has ever been effected in the construction of lamps on Argand's idea. In his sciopticon he converted quantity into intensity of light by the flattening out of the circular wick, and placing two or more of these side by side with the requisite air supply spaces between, with their edges in the axis of the optical system. The flames are thin, very intense, and are close together. This is the class of lamp which is fitted to all the best oil lanterns of the present day. Modifications of the original Marcy lamp have been made by various makers, but none of these are of such a nature as to even becloud the merit which must ever attach to Mr. Marcy's ingenuity.

"It is of great importance that the wicks of the Marcy lamp be properly trimmed, the slightest inequality in one of them affecting the excellence of the lighting; even a minute tag at one end will operate most prejudicially. A little instrument like a pair of pincers, with a flat, sliding blade, having a guillotine action, has been invented in America, which effectually supersedes the use of the sharpest pair of scissors, or even a razor, for this purpose. It costs only a small sum, and no one who wishes to experience comfort in using the oil lamp should be without one."

NATURE'S MIRROR.

NATURE, fair Goddess, so the legends say,
Adown a leafy glade, one sultry day,
With careless footstep strayed, and o'er the brink
Of a cool streamlet bowed herself to drink—
When, lo! upstarting to the mirror clear
The bright reflections of her charms appear.
Delighted with the beauteous vision seen
For the first time, th' imperious sylvan Queen,
Summoned the shadow from the depths to rise,
And Art, submissive, stood before her eyes.
Since then, from age to age, the luckless sprite,
With falt'ring steps the Goddess keeps in sight,
Aping, with toilsome care, each varying phase
Of Nature's matchless symmetry and grace;
Till, pitying her distress, the God of Day,
Majestic Sol, accosts the o'ertasked fay.
"Oh take my rays," quoth he, "and with them power
To seize the fleeting beauty of each hour;
Nay, more, outvying Nature's self, 'tis thine
To immortalize the human face divine;—
The bloom of youth, the smile, the sparkling eye,
The evanescent charms that else would die,
By thee transfixed shall never more depart;
Be known henceforth as Photographic Art;
And to thy name, through all succeeding time,
Shall fanes be reared in every age and clime."

—T. J. PIGGOTT, in *Photographer's World.*

THE American expedition for observing the eclipse of the sun, will set out on October 12th, for West Africa.

It is one of the most important ever sent out by the United States.

The party, including the astronomers, will number 25. The observations will be taken in the interior of Africa, one hundred miles from the coast, in a section of country inhabited by savages, and where the most virulent and fatal forms of fever prevail.

Professor Todd, of Amherst College, is the superintendent of the expedition. In speaking of the expedition, he says:

"We will carry with us astronomical and photographic instruments for viewing the sun while eclipsed, and at the same time taking instantaneous pictures of its appearance. We shall carry twenty cameras, and the largest one will be forty feet long. We shall carry two steam launches, which will be used by the naturalists in making explorations up the Quanza River. Professor

Cleveland Abbe, of the Signal Service, will have charge of the meteorological branch of the expedition. He will use an anemometer in getting the velocity of the wind, a neuphoscope for observing the movement of the clouds, and in addition will send out numbers of red toy balloons for ascertaining the movement of the wind at a higher altitude than the ships. A naval officer will also be deputized to make soundings of the ocean as we proceed. This work will be supplementary to that already done, and will aid materially in getting a better idea of the configuration of the bottom of the Atlantic Ocean.

"The total eclipse will be visible only in a long, narrow path. This path is about 5000 miles long but only 100 miles wide, and extends nearly its entire distance over the ocean. It begins in the Caribbean Sea, and skirts along the northern coast of South America, being visible at only one point there—French Guiana. It then moves eastward until it strikes Africa, a few hundred miles south of the Congo River. There are no islands in the Atlantic from which it could be viewed, and we selected Africa as the best point for our work. An expedition will go from the Lick Observatory, in California, to French Guiana and view the eclipse there. Though they will not have to go so far and be subjected to as many dangers as we will, they will labor under the disadvantage of not having quite as much time to view the eclipse as we will have, and also of seeing it in the morning, before it has gotten high in the heavens."

THE German Photographic Association of Weimar proposes to erect at Munich a memorial tablet to Obernetter. Mr. Karl Schwier at the 18th Wanderversammlung at Weimar, called the attention of the members to the proposition, remarking that a man so widely known and universally appreciated as Obernetter, scarcely needs any eulogy. His labors in photography are indeed a monument to his memory more lasting than marble or brass.

TENTH ANNUAL CONVENTION PHOTOGRAPHERS' ASSOCIATION OF AMERICA.

Office of the President,

BUFFALO, N. Y., Oct. 9, 1889.

Editor American Journal of Photography:

In reply to a letter in your September *Journal* signed by Rothengatter and Dillon, I would say that at the Buffalo Convention it was settled that

no official recognition should be given to any private awards beyond the announcement of winners from the platform.

It has been customary for the parties making awards of this kind to appoint their own judges, collect their markings, and merely hand the names of winners to the presiding officers for announcement.

Had Mr. Eastman's agents informed themselves as to his manner of choosing judges, there would not have been two sets of judges chosen.

The mere fact of Mr. Eastman's making the rules governing his awards the same as those of the P. A. of A. does not make the officers responsible for any acts of his agents or judges chosen.

So far as I understand it the three first judges were as eligible as the second three, for none were chosen according to the rules made by the Executive Committee.

The blunder has been made, and I cannot understand why the officers of the P. A. of A. should now be called upon to straighten out a matter entirely out of their jurisdiction.

In conclusion I would say that the Eastman Dry Plate and Film Co. is alone responsible for the errors of its agents, and consequently are the only ones to look to for a decision in the matter.

H. MCMICHAEL.

[WE shall only say in reply to the above letter, that the arguments advanced to evade the responsibility of the case are not very convincing. The officers of the Convention are in duty bound to investigate error and administer justice, simply because all the parties concerned are members of a corporation over which the Executive of the Convention presides.—Editor AMERICAN JOURNAL OF PHOTOGRAPHY.]

OCTOBER BARGAIN LIST.

Accessories:

1—Bromide Easel, with Kits up to 25x30 . . . . 10 00
1—Haworth's Patent Camera Stand, for 8x10 . . . . . . 6 00
1—Walmsley Reversible Finder 2 50
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1—8x10 Hough's Exterior ground, light right 8 00
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